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Aesthetic judgments in folksonomies as criteria for organising knowledge

Abstract
Principles, justifications and their subjective nature are central issues of knowledge organisation research and practice. This study discusses folksonomies a source of aesthetic judgments and whether those judgments can provide justification for knowledge organisation. Using Flickr photosharing service as an example, the folksonomies are examined as potential source of collective judgments of a larger group of people with a special focus on everyday life aesthetics. The study is based on a visual analysis of clusters of photographs formed by Flickr with a set of common aesthetic adjectives.

1: Introduction
One of the central challenges of knowledge organisation (KO) research and practice is the question of organising principles. Hulme (1911-1912) introduced already in 1911-1912 the notion of (literary) warrant to denote the (literary) criteria of organising knowledge. Since then there has been a lively discussion on different warrants in the literature (e.g. Beghtol 1986; Smiraglia 2009). Hjørland has proposed domain analysis as an approach for reaching pragmatic criteria (Hjørland & Albrechtsen 1995). Even though the problems have been acknowledged, in practice, the veritable criteria are articulated only seldom. Feinberg (2007) calls for a more explicit argumentation of criteria from the part of the designers of KO systems, a view with which Hjørland (2008) concurs. The significance of the challenge is underlined by Gnoli (2008) who lists the problems related to “viewpoint warrant” (viewpoint as a criterion for organising knowledge) as a central challenge of future KO research.

The present study refers to aesthetics as exemplary of the problems related to viewpoints and KO. Aesthetic judgments are essentially cultural and subjective, but at the same time people tend to expect others to concur with their own judgments (Zalta 2009). In order to improve the explicity of the warranting factors, as Feinberg (2007) suggests, of aesthetic organisation of knowledge, the present study explores the possibilities to ground organisatory criteria on an empirical investigation of explicit aesthetic judgments of a group of people. This study sets to find out whether folksonomies might be used as a source of aesthetic judgments and justification for KO using photosharing service Flickr <www.flickr.com> as an example. It is assumed that, as a form of user warrant, a folksonomy can be a relevant source of judgments for everyday life aesthetics (Mandoki 2007). Further, it is assumed that the totality of Flickr users who have tagged images using same tag form a source of a collective opinion of users (or in the case of Flickr, an author: see Cox 2008). Consequently, this group can warrant various kinds of judgments, of which the aesthetic judgment is discussed in more detail in the present paper. Common aesthetic opinions are conceivably transient and, unlike e.g. scholarly knowledge, are not primarily based on such sources of warrant such as the literature.
2: Aesthetics and knowledge organisation

In KO research, the notion of aesthetics can be argued to be implicitly present in concepts such as viewpoint warrant, cultural warrant and user warrant. It is worth noting that aesthetics and aesthetical judgments are not limited to explicitly aesthetic topics such as the works of art, although they are essential in that particular domain (Zalta 2009). Similarly, the aesthetic nature of a classification can be quite implicit. Ørom (2003) shows how aesthetic judgements can be found in existing art classifications. Aesthetics has been discussed also as a factor of organising (Saarti 1999) and evaluating fiction and, in more general terms, literature for recreational reading (Reuter 2007). A central theme of the aesthetics related research in KO is that aesthetics is a subjective domain of knowledge parallel to the positivist tradition of organising knowledge. As Tennis (2007) argues, KO needs to move to a more descriptive direction to fit the human needs and urges to organise.

3: Social indexing and Flickr

The present study is conducted in the domain of uncontrolled indexing of photographs and more specifically, in the context of the photosharing service Flickr. Cox (2008) writes about Flickr as a new paradigm of digital libraries with less focus on quality and control. The success of the service to engage users has been phenomenal (Cox 2008) and, not least due to its popularity, has become one of the icons of the Web 2.0 (Godwin 2007).

The possibility to tag – socially index – photographs was borrowed to Flickr from Del.icio.us social bookmarking service (Cox 2008). In Flickr, tagging has never become a central feature of the user behaviour in the service, the quality of tags is not always very high and most of them are assigned by the people who upload photos (Cox 2008). Rafferty & Hidderley (2007) have referred to Flickr as author-indexed instead of user-indexed database. Although the tags are less important in Flickr than in some other services based on folksonomies, the amount of photographs uploaded in the service have been argued to compensate for the imprecise descriptions (Cox 2008). Motivations to tag and to make photographs findable in different contexts have been found to be both social and personal (Ames & Naaman 2007). Bischoff et al. (2008) have found evidence of the usefulness of tags in information searching, although Chung and Yoon (2009) conclude that tags and search queries differ significantly. There are a number of well-known general issues in image indexing and retrieval (e.g. Jörgensen 2003). Angus et al. (forthcoming) have studied Flickr focusing on whether universities use Flickr and on whether Flickr can be used as an academic image resource. Especially the results of the latter investigation are of interest for the present study, as they show that Flickr contains significant amounts of images related to 12 randomly chosen academic subject categories. Schmidt and Stock (2009) studied the emotions raised by a set of images uploaded to Flickr and how the emotions were related to the tags attached to the images and found convincing correlations between “emotional” tags and measured emotions. Other Flickr research has focused on users (e.g. Nov et al. 2008) and, for instance, the social aspects of the service (Cox et al. 2008).
4: Assumptions and hypotheses

The present study is based on an assumption that the tags in Flickr photographs represent categories of interest of Flickr authors. The assumption is based on earlier studies on Flickr (Rafferty & Hidderley 2007; Cox 2008). On the basis of this assumption, it is assumed further that the tags co-occurring with “aesthetic tags” (terms representing aesthetic judgments, in this study derived from Jacobsen et al. (2004)) form a statement of the aesthetic qualities of the photographs described by the co-occurring tags. On the basis of the problem statement of the present study (whether folksonomies can be used as a source of justification), it is hypothesised that the statements form together a collective aesthetic viewpoint of the group of people who have tagged photographs with same tags, and that these aggregated statements could be used in deciding whether and how objects can be organised according to their aesthetic characteristics. It is assumed that folksonomies like Flickr tags can be an interesting source of especially commonplace aesthetic judgments (made on traditionally unaesthetic objects (Mandoki 2007)) than, for instance, literature or art criticism, because of their equally mundane nature. Another potential advantage of folksonomies is that they represent a statistically calculated consensus of a group of people instead of an individual (possibly consensual) opinion. Although the quality of tags on individual photos has been deemed relatively low and inaccurate, based on Cox (2008), it is assumed that if they are on a system level representative enough to allow practical level of recall, on the same level, they are representative of the photographs and their average aesthetic qualities. The aesthetic representativeness of Flickr is underlined by another observation of Cox (2008) that the prevalent mode using it is browsing for visual pleasure rather than information seeking for a specific need.

5: Method

The hypothesis was tested by visual observation of the clusters of photographs formed by aesthetical tags. A further quantitative verification of the effectiveness (in information retrieval) of the resulting aesthetic justification is left to a future study.

The aesthetic tags (beautiful, ugly, nice, pretty, elegant, aesthetic, big, round, repulsive, wonderful, groovy, fascinating, stylish, shapely, marvelous, charming, handsome, varicolored, thick, angular, interesting, gorgeous, thin, goodlooking, cute, delicate, harmonious, abhorrent, pleasing, icky, manky, colored, graceful, enjoyable, attractive, fine, subtle, tasteful and cool) were derived from a list of 39 typical aesthetic adjectives collected in an empirical study by Jacobsen et al. (2004). One limitation of the list is that all words can be used to express aesthetic judgments (describing a person as a lion can be an aesthetic appraisal). Another limitation is that the adjectives had been translated from German to English and the translations are not necessarily the most typical words in English language. Thirdly, the list does not attempt to balance on different kinds of aesthetic judgments (e.g. negative, positive).

A Flickr search was made on each adjective using the built-in search facility (basic search) of Flickr. Basic search was used consequently, because Rafferty & Hidderley (2007) note that the different search alternatives retrieve different sets of photographs with same queries. The related tags are the ones provided by Flickr and were collected from the lists on tag pages.
The material was analysed by close reading (DuBois 2003) of the tags and web pages with example photographs and was complemented with a directed content analysis (Hsieh & Shannon 2005) (using descriptive tags as a starting point) of the sample photographs shown on the web page of each cluster. The focus of interest was on the general level of the content of the photographs (i.e. does the photograph depict an animal, a building, or blue objects). The number of photographs described using each tag in Flickr was noted to get a general impression of the typicality of tags. Finally the clusters provided by Flickr were analysed visually and labelled on the basis of tags and the sample photographs provided by Flickr. To reflect the subtleties of the clusters, the labels were written to represent the contents of the photographs without any attempt to use standardised labels. After labelling, the existing labels were normalised whenever the differences related to spelling and word order (e.g. for women and girls and girls and women, the first form was chosen).

6: Findings
The findings show a notable variation in the frequency of adjectives used in tags. cute and beautiful are the most frequent with over million photographs tagged with each. varicolored and abhorrent are respectively the least used ones with 30 and 25 mentions.

The face-value consistence of associations between aesthetic adjectives and co-occurring tags seems mostly rather logical from the cultural point of view of the researcher (positive adjectives and “positive” topics; negative adjectives and “negative” topics). icky is clustered with insects and spiders, swans are graceful, girls, cats and dogs are cute, and flowers are delicate. A user study on a heterogeneous global population would be likely to give interesting insights into the associations and their universal accuracy.

On a topical level, a number of seemingly contrary aesthetic judgments were observed. For tag beautiful, girl is the most common related tag, while for ugly it is on the fifth place. Other related tags do, however, refine the judgment. The most frequent tag associated with ugly is face, possibly suggesting that ugliness is related especially to (photographs depicting) faces while beauty could be a more general characteristic. The analysis of the frequencies of co-occurring tags show that aesthetic adjectives tend to co-appear with other aesthetic adjectives. The most frequent (occurring at least 4 times) topical tags (substantives) are girl (18), portrait (15), woman (14), nature (8), smile (7), eyes (6), model (6), flower (5), sky (5) and color (4).

Analysis of the clusters of co-occurring tags gives contextual information about the meaning and context of frequently appearing tags. The clusters are formed of two or three tags in Flickr. For five adjectives (out of 39) with low number of tag instances (varicolored and abhorrent) and (likely) with too weak associations (harmonious, enjoyable, pleasing), Flickr provided no clusters. With 2 adjectives, the analysis could not reveal common features within the clusters. Adjective aesthetic appeared only in clusters composed of different types of marker tags and repulsive appeared only with synonyms and in one heterogeneous cluster. The total number of clusters was 114 of which 94 cases or 82% were valid. In the remaining 20
cases the clusters were not depicting a distinguishable topic. In 7 cases the clusters comprised of markers, for instance, of photographers or groups associated to the images. In 6 cases the aesthetic adjective was used as a substantive or a part of compound word (e.g. Big Ben or merry-go-round). Similarly, in 5 cases the cluster comprised of synonymous or nearly synonymous adjectives (e.g. repulsive with disgusting and gross). In 2 cases (interesting with interestingness, blue, light, and repulsive with ugly, monster) the visual analysis of the associated photographs indicated that the tags were used in two or more different meanings and the cluster was not a real cluster of similar photographs. In some cases it seemed debatable whether adjectives were used to describe “measurable” qualities or aesthetic judgments. E.g., the adjective big is related to a cluster that was labelled “Eyes of cats”. A statement that “Macbook Air” is thin is measurable in comparison to a thicker laptop, but it can be also an aesthetic statement of the characteristics of that particular type of computer.

Table 1 (clusters formed by tag ugly) exemplifies the results and the analysis. Cluster column contains the analytical label attached to the cluster during the analysis phase of this study. Tags column contains tags that formed the cluster together with ugly. There is some overlap, but most of the clusters are related to a single adjective. E.g., clusters titled “Dogs and puppies” relate both to handsome and “Girls’ eyes” to beautiful and pretty. The number of unique clusters is 73.

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Tags</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portraits of girls</td>
<td>face, portrait, girl, self, selfportrait, scary, weird, eyes, hair, funny</td>
</tr>
<tr>
<td>Bird closeups</td>
<td>macro, nature, bird, insect, animal, bug, dog, cute, fly, closeup</td>
</tr>
<tr>
<td>Concrete architecture</td>
<td>architecture, building, concrete, modern</td>
</tr>
<tr>
<td>City streets</td>
<td>urban, city, street, art, painting</td>
</tr>
</tbody>
</table>

Table 1: Clusters related to tag ugly (as an example of the data and analysis).

6: Discussion and conclusions
The findings show that tags composed of aesthetic adjectives form topical clusters of photographs in Flickr that can be construed as collective aesthetical judgments on the represented topics. The most common objects of aesthetic interest were females and nature while individual adjectives were associated to a myriad of other topics such as men (handsome) and architecture (ugly, angular). The findings are in line with the study of Schmidt and Stock (2009) on emotion-related tags. The present study did not attempt to study aesthetic views of any particular users, but focussed instead on the observable consistence and clustering of the tags. The behaviour of the clusters does, however, provide a strong indication that, similarly as the emotional tags, the aesthetic tags can be used to make inferences on the qualities of the photographs. It is, however, similarly clear that the clusters have their limits and do not, for instance, evidence of the intentions of individual taggers.

The findings raise also a more profound question on the implications of the tagging data and their relation to the justification of KO. The relevance of Flickr tags as a source
of aesthetic judgments is strengthened by the fact that the viewpoint is an aggregate of viewpoints of a larger group of people. Flickr users can hardly be argued to be a very heterogeneous group (e.g. Cox et al. 2008) in every aspect and, for instance, a clear generic Western cultural hegemony can be sensed in the judgments. In spite of the limitations, Flickr users represent nonetheless a certain consensus of people originating from different countries with some variation in their backgrounds (for figures, Cox 2008). As such their aggregated viewpoint represents a very different type of aesthetic opinion than a viewpoint of a school of art criticism, and as such it can well complement other sources of aesthetic views.

Of the 114 analysed clusters, 94 were valid and represent relatively distinct referents of aesthetic judgments or such qualitative judgments that refer to some aesthetic or quasi-aesthetic qualities of the photographs. The fact that the majority of the clusters were valid and could be labelled sensibly provides a strong indication that the tags and tag clusters can be used in information searching as Bischoff et al. (2008) have suggested earlier. The adjectives and their associated clusters indicate, for instance, that objects representing women with flowers can be categorised as potentially related to aesthetic beauty, concrete architecture to ugliness, sky to wonderfulness, pinup models to shapeliness, and cats and dogs to cuteness. Many of the so-called aesthetic universals (Dutton 2001) are represented among the topics like the typical aesthetic examples discussed in aesthetics literature (McMahon 2001). The finding is also in line with the earlier results of Angus et al. (forthcoming) that Flickr contains topical images and the tags do represent reasonably well the content of the images.

The use of Flickr tags as an expression of aesthetic judgment has some innate problems. Even though the clusters formed by aesthetic adjective complemented with three other tags tend to return visually similar images, there are anomalies caused by varying use of tags, e.g. in ironic sense or as markers. This suggests of the diversity of tagging motivations explored earlier by Ames and Naaman (2007).

The second limitation is that the co-occurrence of tags alone does not predict anything else than aesthetic potential of the combination. Even though the use of clusters filters individual anomalies, it is likely that in some cases, an aesthetic adjective is consistently used to mark the qualities of the photograph and in some cases aesthetics of its topic or subject. The third limitation is that the clusters do not indicate definite judgments. Portraits of women or girls appeared six times (eight times with additional specifier) as a label for a cluster with adjectives ugly, elegant, wonderful, stylish, marvelous, interesting, subtle and cool. Same topics and same photographs can be described using very different and even opposite adjectives. The last two limitations reflect, however, more the nature of aesthetic judgments themselves than a flaw in the tagging system or the approach. All perceptions of aesthetics or lack of it are applicable only in a given context. The beauty of a girl or of nature is in the eye of the beholder.

In spite of their limitations, tags have many advantages. The aesthetic viewpoint represented by tags seems to be consistent to a degree of being capable to provide insights into how photographs could be indexed in order to improve their retrievability. Even though the aesthetics of a photograph differ from the aesthetics of other objects and tags can not be moved directly from one context to another (Chung & Yoon 2009), considering the general nature of the topics represented by the clusters, the insights
might also have relevance for knowledge organisers working with other types of material. *bird*, *swan* and *white* are associated with aesthetic adjective *graceful* and their co-occurrence represents an aesthetic viewpoint that can be used to motivate decisions to index and classify (graceful) photographs and other objects embodying birds, swans and whiteness as *graceful*. Finally, from the practical point of view, the advantage of folksonomies is that they are both easy and ready to use. Even if they were somewhat inaccurate and only partially helpful, they still provide a highly cost-efficient way to plug into a vast repository of current viewpoints on a large number of topics.

References


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